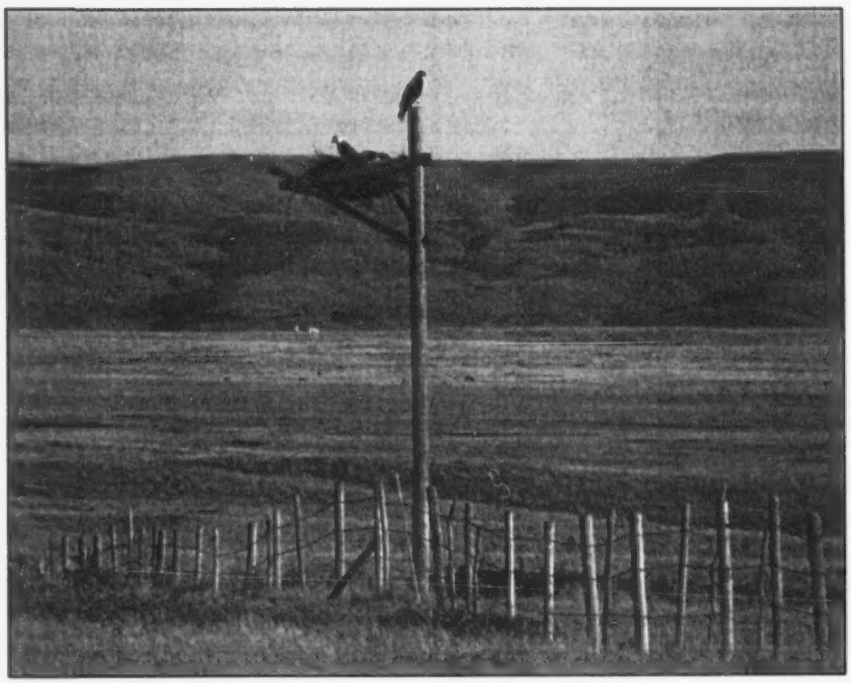
alberta's species at risk program

Ferruginous Hawk Artificial Nest Poles: Inventory and Construction Protocol



Alberta Species at Risk Report No. 140

Government of Alberta

Ferruginous Hawk Artificial Nest Poles: Inventory and Construction Protocol

Prepared for:
Alberta Sustainable Resource Development

Prepared by:
Anna Migaj, Cindy Kemper and Brandy Downey

Alberta Species at Risk Report No. 140

March 2011

Publication No.: 1/502
ISBN: 978-0-7785-9365-2 (Printed Edition)
ISBN: 978-0-7785-9366-9 (Online Edition)
ISSN: 1496-7219 (Printed Edition)
ISSN: 1496-7146 (Online Edition)

Cover Photo: Anna Migaj

For copies of this report, contact:

Information Centre – Publications
Alberta Environnent/ Alberta Sustainable Resource Development
Main Floor, Great West Life Building
9920 108 Street
Edmonton, Alberta, Canada T5K 2M4
Telephone: (780) 422-2079

OR

Visit our website at:
http://srd.alberta.ca/fishwildlife/speciesatrisk/projectreports.aspx

This publication may be cited as:

Migaj. A., C. M. Kemper, B.L. Downey, 2011. Ferruginous hawk artificial nest poles: inventory and construction protocol. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 140, Edmonton, AB. 22 pp.

EXECUTIVE SUMMARY

The ferruginous hawk, an *endangered* species in Alberta, breeds exclusively in the grasslands of North America. Availability of nesting sites has been identified as a key limiting factor of this species. Artificial nests poles (ANPs) were identified as a possible recovery action by the Alberta Ferruginous Hawk Recovery Team, however a number of questions were raised on how effective the installation of ANPs in the past have been in maintaining ferruginous hawks.

The Ferruginous Nest Pole Inventory was completed in 2009, and included cataloguing the nest platforms and their state of repair, identifying their use by ferruginous hawks and other species, and evaluating any conflicts that their placement may have created for other species at risk. Of the149 poles evaluated, 45 had active ferruginous hawk nests. A number of issues were identified that may have caused poles not to be active through this inventory. ANP's may be an appropriate recovery action for ferruginous hawks in areas that meet key criteria.

Following this inventory, a standardized protocol, *Artificial Nest Pole Installation and Construction Protocol,* was developed which outlines criteria for the use, construction and installation of ANPs. This protocol will assist wildlife managers in balancing the needs of the ferruginous hawk with other species at risk that have similar provincial ranges.

ACKNOWLEDGEMENTS

Funding for the 2009 Alberta Nest Pole Inventory was provided by Alberta Sustainable Resource Development-Fish and Wildlife Division Species at Risk Fund. In-kind funding was provided by Ron Bjorge (ASRD) who donated wage staff time in order to finalize this project.

Thanks to Kathryn Romanchuk (ASRD) and Francois Blouin for completing the initial phase of the study. Leo Dube (ASRD) assisted with the collection and deciphering of historical artificial nest pole information. Darryl Jarina (Prairie Conservation Forum) assisted with the field work. Lance Engley and the Alberta Conservation Association assisted in the search for historical nest pole locations through advertisements in *Conservation Magazine*. We also thank Callie Smith, Resource Data Biologist with the Licensing and Resource Data unit, Fish and Wildlife Division, for producing GIS maps for this project. Lonnie Bilyk and Sturart Nadeau (ASRD) assisted with the development of the tracking database and FWMIS search. Kristen Rumbolt (Prairie Conservation Forum) and Nicki Heck (Altalink) provided the nest pole diagrams. A special thanks to Rob Heiland for saving us from our doomed truck, which was happily retired at the end of this project.

Lastly, thanks to the many landowners and members of the public that submitted ferruginous hawk platform locations, and/or graciously provided access to their land for surveys.

TABLE OF CONTENTS

EXECUTIVE SUMMARY iii
ACKNOWLEDGEMENTS iv
TABLE OF CONTENTS v
LIST OF FIGURES vi
LIST OF TABLES vi
LIST OF APPENDICIES vi
1.0 INTRODUCTION 1
2.0 STUDY AREA 2
3.0 METHODS 2
3.1 ANP Data Solicitation 2
3.2 Field Methods 2
3.3 Data Analyses 4
4.0 RESULTS 4
4.1 Pole Condition and Species' Use 4
4.2 Habitat Variables 6
4.3 Additional Observations 8
5.0 DISCUSSION 8
5.1 Pole Inventory and Species' Use 8
5.2 Habitat Variables 9
6.0 MANAGEMENT IMPLICATIONS AND FUTURE DIRECTION 10
7.0 ARTIFICAL NEST POLE INSTALLATION AND CONSTRUCTION PROTOCOL 11
7.1 Pre-installation activities and research 11
7.1.1When to use an artificial nest pole. 11
7.1.2. General location 11
7.1.3 Impacts of other wildlife 12
7.1.4. Habitat and disturbances 12
7.1.5 Prey 12
7.2 Pole Design 13
7.3 Pole Installation 13
7.4. Monitoring and Maintenance 13
8.0 FURTHER REQUIREMENTS FOR RECOVERY ACTION IMPLEMENTATION 14
9.0 LITERATURE CITED 16
10.0 PERSONAL COMMUNICATION 17

LIST OF FIGURES

Figure 1: Use and availability of ferruginous hawk nests on artificial nest poles in the Hanna, Brooks and Manyberries areas. Available ANPs include those in Class I and II, and those not in use by Swainson's hawks.....5

Figure 2: Proportion of each class of platform occupied by nesting ferruginous hawks.....6

Figure 3. Proportion of active nests relative to the availability of native graminoid within 400m of the ANP.....7

Figure 4. Ferruginous hawk occupancy on available ANPs with power lines, roads, buildings, or fences within 400m. Expected values derived from total number of active nests on all available ANPs studied with and without abovementioned infrastructure within 400m.....8

LIST OF TABLES

Table 1. Classification system used to assess nest condition.....3

Table 2. Classification system used to assess artificial nest pole condition.....3

Table 3: Use and availability of ferruginous hawk nests on artificial nest poles in the Hanna, Brooks and Manyberries areas. Available ANPs include those in Class I and II, and those not in use by Swainson's hawks.....6

Table 4 .Chi-Square Goodness of Fit results. Statistic is derived from occupancy of available nest platforms with and without the selected habitat features within 400m of the ANP. Significance indicated in bold.....7

LIST OF APPENDICIES

Appendix A.....18
Appendix B.....19
Appendix C.....21

1.0 INTRODUCTION

The ferruginous hawk (*Buteo regalis*) is an obligate grassland species, one that has exhibited substantial range contraction and population declines in Alberta (ASRD and ACA 2006). The species was listed as *Threatened* under the *Alberta Wildlife Act* in 1987, and was uplisted to its current *Endangered* status in 2006; nationally, it has been listed as *Threatened* under Canada's *Species at Risk Act* (SARA) since June 2009.

The species breeds almost exclusively in grassland or shrub-steppe habitats and is strongly associated with landscapes that comprise greater than 50% native grasslands (Schmutz 1993). The ferruginous hawk prefers elevated nest sites, usually selecting lone trees, large shrubs, abandoned shelterbelts, or cliffs but will occasionally nest on level ground (Schmutz 1999). Across the Grassland Natural Region (GNR), the few remnant trees and shelterbelts are dying, being removed, or are negatively impacted by cattle, thereby further reducing the number of potential nest sites for ferruginous hawks. The availability of nesting sites was identified as a key limiting factor for this species (Schmutz 1999; The Alberta Recovery Team 2009).

Artificial nest poles (herein, "ANPs", or "platforms"), which usually consist of a platform mounted about 2.5m above the ground on a wooden pole, have been used as a management tool for this species over the past few decades. For example, the Bureau of Land Management erected 100 ANPs between 1987-2002 to mitigate nest disturbances resulting from oil and gas activity in south-central Wyoming (Neal 2007). Within Alberta ANPs were erected in the late 1970s and early 1980s as a management tool to increase the number of nesting pairs (Schmutz et al. 1984). There is evidence to suggest that the accessibility of a nest to ground predators may have a larger influence on nest productivity and reoccupancy than the substrate itself (Neal 2007). In the absence of inaccessible natural nest sites such as trees, ANPs may be the next best alternative for productivity and success of nesting ferruginous hawks (Neal 2007), especially in the face of a declining population.

Since the 1980s, additional platforms have been erected across ferruginous hawk range by landowners, conservation groups, and industry. One of the actions listed in the provincial recovery plan is to conduct an inventory of existing ANPs (Alberta Ferruginous Hawk Recovery Team 2009). This report details the findings of and recommendations stemming from an inventory conducted in 2009.

The main goal of this project was to identify the role artificial nest poles have in the recovery of the ferruginous hawk. The primary objectives were to:

1. Locate, map, and assess the condition of ANPs in Alberta.
2. Identify and evaluate conflicts with the installation of these ANPs on other species at risk.
3. Evaluate the effectiveness of ANPs for the recovery of the ferruginous hawk.
4. Develop a protocol for future ANP development based on the findings of this study.

2.0 STUDY AREA

The inventory was conducted in three general areas: (1) south of the town of Hanna, (2)north of the town of Brooks, and (3) around the hamlets of Bindloss and Manyberries, in southeast Alberta. The natural subregions included in this inventory are the dry mixed-grass, the mixed grass and parts of the northern fescue (Natural Regions Committee 2006); the core population of ferruginous hawks is located within these regions of the Grassland Natural Region. There are small numbers of ferruginous hawks outside these subregions but the numbers are negligible (Downey 2005). Agriculture is the dominant land use with vast areas of cultivated fields, pasturelands and a few large tracts of native prairie scattered throughout the region. Oil and gas development, towns, and cities are also present.

3.0 METHODS

3.1 ANP Data Solicitation

Prior to the start of the inventory, locations of all known nest platform sites were compiled and entered into a Microsoft excel spreadsheet and mapped using Arcview 9.2. Data were obtained from the Fisheries and Wildlife Management Information System (FWMIS), unpublished reports and databases within the Fish and Wildlife Division, and from researchers and industrial developers operating in the study area. Solicitations of artificial nest pole locations were made to the public through Alberta Conservation Association's *Conservation Magazine,* and additional locations were obtained through these efforts. Some of the platforms had an associated historic platform number that would have been issued when the platform was erected, or sometime thereafter.

3.2 Field Methods

The inventory occurred between June 1 and July 5, 2009; surveys were not conducted during periods of rain or very high wind. Each known site was visited and the date and time of the visit recorded. An attempt to locate each nest platform was first made from the road or trail using binoculars and spotting scopes. If unsuccessful, a larger area was searched by vehicle or on foot, as circumstances allowed. If a nest platform was still present at the site, it was assigned its historic platform number; if a historic number could not be determined (e.g., if the platform was a considerable distance from the location indicated in the records), it was assigned a new number. In either circumstance, the location of the platform was recorded using a Garmin GPS unit in Universal Transverse Mercator (UTM) NAD 83 and records were subsequently updated. Ferruginous hawks are known to be highly susceptible to human disturbances, and as such, platforms with active nests were surveyed from a minimum distance of 200 m whenever possible. Platforms with inactive or no nests were approached on foot as closely as terrain and access rights permitted.

At each nest pole the following was recorded/assessed:

- Presence/absence an active nest on the platform, and species occupying platform, if active
- Condition of nest (see Table 1.)
- Condition of the nest platform (see Table 2.)

Table 1. Classification system used to assess nest condition.

Class No.	Description
0	Observer too far away to assess.
1	Appears intact and recently used.
2	Nest slightly damaged or no evidence of recent use.
3	Nest very damaged, likely not used for a long time.
4	Nest material missing, hanging from pole, fallen, or otherwise non-functional.

Table 2. Classification system used to assess artificial nest pole condition.

Class No.	Description
0	Observer too far away to assess.
I	pole intact; appears new, or is sturdy, with no obvious maintenance needed
II	pole needs maintenance but is still functional (leaning, slightly rotting; pieces broken)
III	pole needs substantial maintenance but could be salvageable (substantially leaning, rotting, or much of it broken).
IV	Pole not salvageable (needs replacement to be functional)

Features and habitat surrounding the nest platform site were recorded for each nest site. Barbed wire fences, roads, power lines, buildings and any other man-made structures within 400m of the platform were noted The distance of each feature from the platform was determined using a Bushnell Laser Rangefinder Elite 1500, and recorded in categories with 50m increments (0-50m, 50-100m, 100-150m…350-400m). The percentage of different land use classifications (eg., cultivated field, native prairie, wetland, etc.), topography (eg., hills, flat plains, coolees, etc.), and potential natural nest sites within an 800m radius around the platform were assessed visually and recorded. Additionally, the presence of ground squirrels and other species of interest were noted, and potential conflicts of the platform with other species at risk were identified (e.g., greater sage-grouse lek, burrowing owl nests). Photos were taken of each platform and surrounding terrain.

All data were entered into a master Microsoft Excel spreadsheet and original datasheets and pictures will be kept by the Lethbridge Species at Risk Biologist. Data was submitted to FWMIS

3.3 Data Analyses

Chi-Square Goodness of Fit tests were used to test for independence between ANP use and various habitat variables (vegetation, presence of human infrastructure, etc.) in the immediate vicinity (400m) of the artificial platforms. Yates' Correction for Continuity was applied where appropriate. Only platforms considered available for use (class I and II) were included in the analyses. The alpha value for accepting the null hypothesis was set at 0.05.

4.0 RESULTS

4.1 Pole Condition and Species' Use

A total of 199 poles were identified from historical records in FWMIS and by area biologists. Of these, 142 poles were located during the 2009 inventory; seven additional new platforms were also found (Figure 1). The field observers were not able to match 95 poles to a historical name; the majority of these poles were found in the Bullpound Pasture, located to the east of the town of Sheerness. These poles were given a new nest pole name.

Of the 149 poles assessed during the inventory (Appendix A):

- 57 were found to be in good condition (class I)
- 73 were found to be in need of some minor maintenance (class II)
- 15 were in need of major maintenance (class III)
- 4 had fallen down (class IV)

Forty-eight of the 149 poles found had active raptor nests. All were ferruginous hawk nests, with the exception of three Swainson's hawk (*Buteo swainsoni*) nests. All nests but one (class III) were found on poles that were classified as being in good condition (class I) or only in need of minor maintenance (class II). Figure 3 illustrates the proportion of each class of ANPs with active nests. For the analyses below, ANPs with the three Swainson's hawk nests, as well as class III and IV ANPs were omitted. This left a total of 127 ANP's available for use by ferruginous hawks.

There were obvious differences of nest pole utilization between geographic areas. Three distinct areas are home to the majority of nest poles: the Hanna Area, the Brooks Area and the Manyberries Area (Table 1). Despite that the Hanna Area had the greatest number of poles available; it had the fewest ferruginous hawk nests located on poles of the three areas.

It should be noted that project staff were not able to get to the Manyberries area and instead relied on local FWD staff to assess these poles. Only 2 poles were located during this inventory however several sites were inaccessible due to ground condition and landholder permission. Further work will be required in the Manyberries area and therefore the area was not mapped during this inventory (Schmutz unpublished).

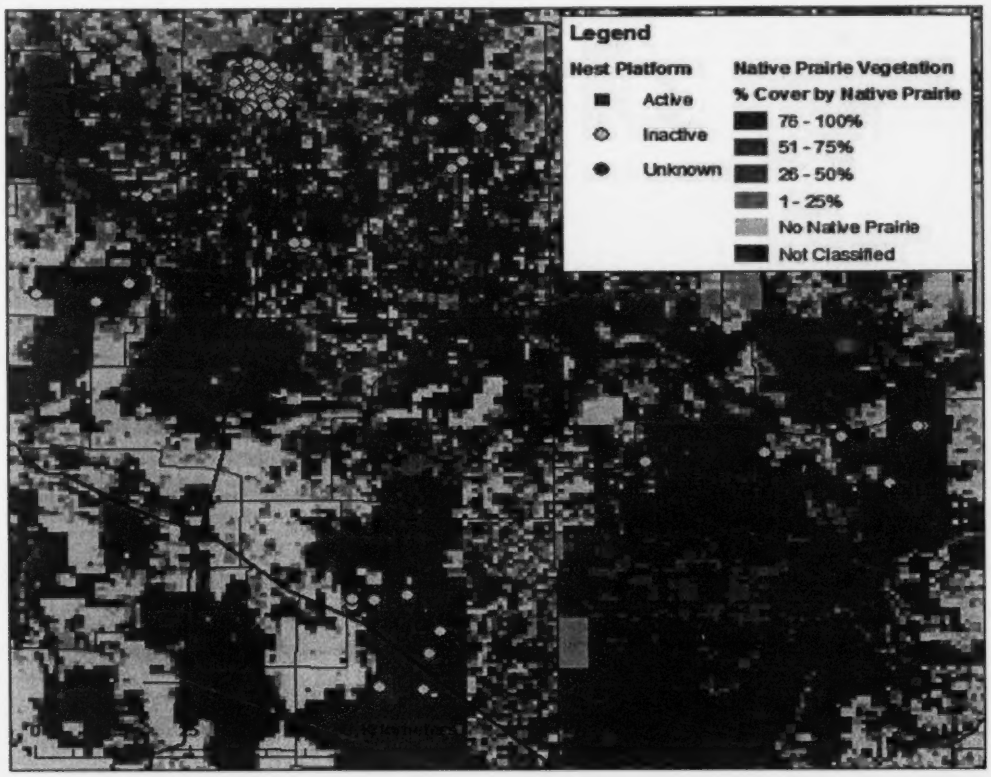


Figure 1: Use and availability of ferruginous hawk nests on artificial nest poles in the Hanna, Brooks and Manyberries areas. Available ANPs include those in Class I and II, and those not in use by Swainson's hawks.

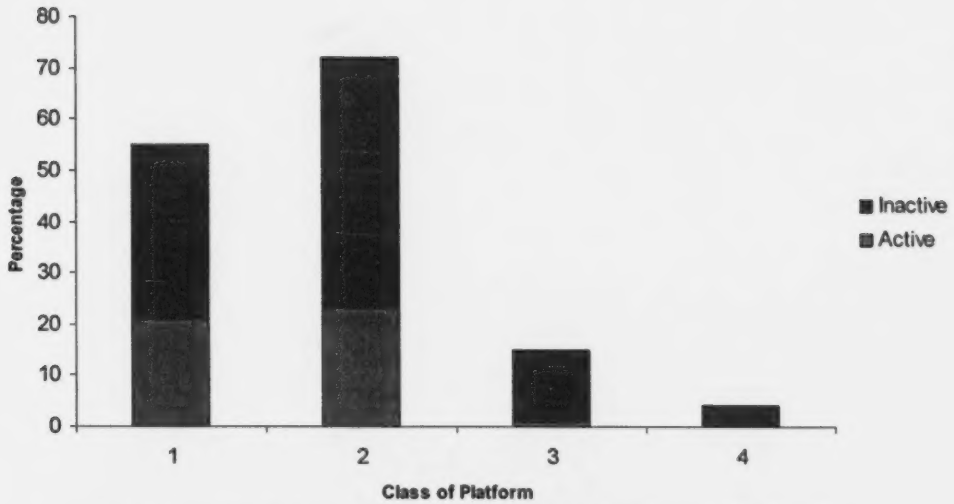


Figure 2: Proportion of each class of platform occupied by nesting ferruginous hawks.

Table 3: Use and availability of ferruginous hawk nests on artificial nest poles in the Hanna, Brooks and Manyberries areas. Available ANPs include those in Class I and II, and those not in use by Swainson's hawks.

Area	No. poles utilized by ferruginous hawks	No. of poles available	% Use
Hanna	10	80	12.5%
Brooks	33	51	64%
Manyberries *	2	2	100%

* The Manyberries area was not entirely surveyed therefore there may be additional poles in the area which may or may not be used by the ferruginous hawk.

4.2 Habitat Variables

Ninety-one percent of the active nests occurred in habitat <50% native graminoid (grassland); however it should be noted that the majority of nest poles had been erected in this habitat type based on the species' preference for native grassland (Figure 4). When the availability of class I or II poles are also considered, the slightly higher than expected use of ANPs in >50% native graminoid was not significant (p= 0.49).

Significantly fewer (four of 26) available ANPs within 400m of a lake or wetland were occupied than expected (p = 0.02; Table 4).

Ferruginous hawks used ANPs that had no alternative natural nest sites within 800m (p= 0.02).

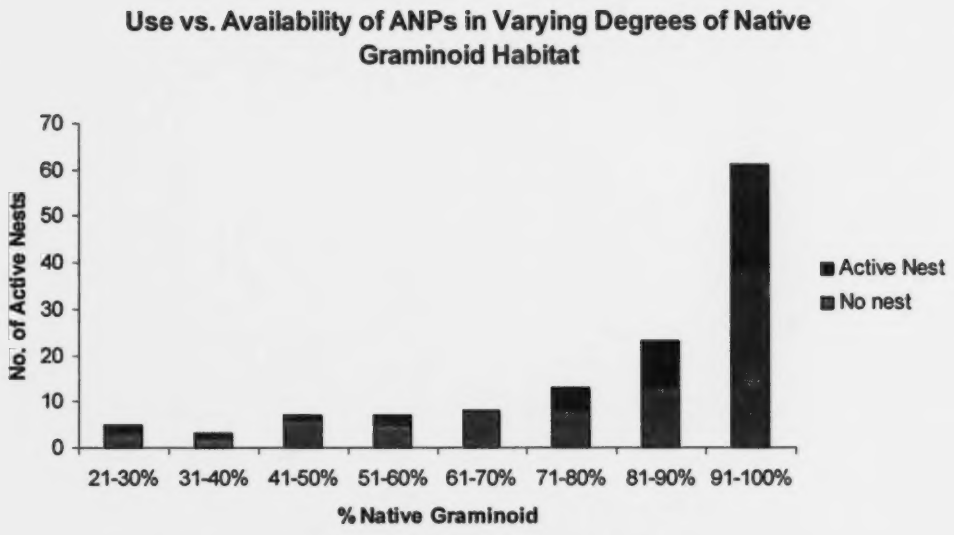


Figure 3. Proportion of active nests relative to the availability of native graminoid within 400m of the ANP.

Table 4 .Chi-Square Goodness of Fit results. Statistic is derived from occupancy of available nest platforms with and without the selected habitat features within 400m of the ANP. Significance indicated in bold.

Feature Selected	P-value
>50 % Native Graminoid	0.489
No wetlands or lakes	**0.021**
No natural nest sites[1]	**0.019**
No power lines	0.096
No buildings	0.291
Roads	0.542
Fences	**0.002**

[1]This feature was measured within 800m of each ANP.

All but three ferruginous hawk nests were found on poles with at least one type of development near by including fences, roads, power lines, buildings (homes, battery stations, etc.). While it appeared that ferruginous hawks avoided power lines and buildings ($p=0.09$ and 0.29, respectively), and one more available nest near a road was occupied than expected (34 rather than 33; $p=0.54$), none of these associations were statistically significant. Ferruginous hawks selected significantly more sites with fences within 400m than expected ($p<0.01$; Figure 5).

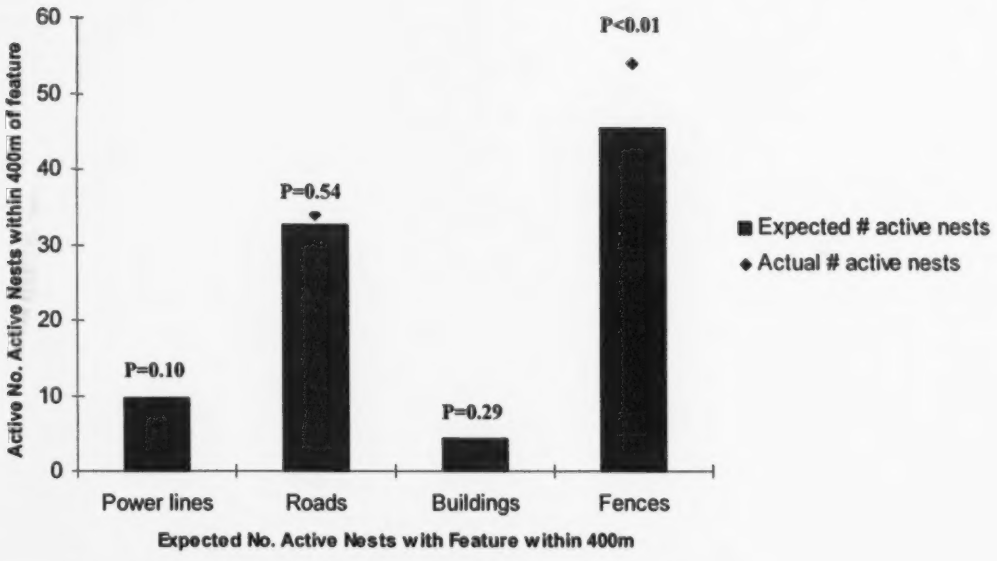


Figure 4. Ferruginous hawk occupancy on available ANPs with power lines, roads, buildings, or fences within 400m. Expected values derived from total number of active nests on all available ANPs studied with and without abovementioned infrastructure within 400m.

4.3 Additional Observations

No conflicts with ANPs and other species at risk were observed during the surveys. No obvious relationship was observed between the presence of ground squirrels and occupied ANPs. However systematic surveys for additional species at risk or ground squirrels were not conducted. All additional species at risk and ground squirrel observations were incidental in nature.

5.0 DISCUSSION

5.1 Pole Inventory and Species' Use

The majority of historical platforms were difficult to pinpoint in the field; some poles were found as far as 2.5 km from the recorded historical site. This discrepancy stems in large part from the lack of available GPS technology in the 1980s when the majority of the poles were erected. In many cases, locations had to be interpreted from hand-drawn dots on maps, verbal descriptions, and the like, which led to some error.

A larger proportion of available ANPs were used in the Brooks region than in Hanna (64% and 12.5%, respectively). Part of the reason for the discrepancy in platform use

among areas might be that many of the platforms in the Hanna area were clustered closely together and the prey base may not be able to support the number of nesting pairs. Unlike ANPs in other areas of the province, the Hanna poles were not erected as a conservation or mitigation effort but for a long term scientific study on both the ferruginous and Swainson's hawk (Josef Schmutz pers .comm). These poles may have been installed purposely closer together to facilitate the study and not necessarily to provide a long term nesting solution for the species. However this is speculative, as this study was a one time survey and did not include an extensive review of the historical use of these poles. The population of ferruginous hawks was much higher in the late 1980s and early 1990s, and the poles may have provided nesting habitat for the larger population at that time.

5.2 Habitat Variables

Ferruginous hawks appeared to select ANPs that had no water within the 400m radius; however, 2009 was a drought year, so they may not have been necessarily selecting against ephemeral wetlands. Several more years of surveys, that would encompass a broader range of climatic conditions, including precipitation, would be needed to conclude with confidence that ferruginous hawks avoid wetlands.

The absence of alternative natural nesting sites seemed to increase the likelihood of ferruginous hawks using an ANP. Perhaps this is in response to a perceived reduced chance of intraspecies competition for resources. Alternatively, ferruginous hawks may be more inclined to nest on ANPs where no natural nest sites are available, simply as a result of nest site availability in general. This would lend support to the importance of ANPs as a recovery action for ferruginous hawks.

Given that ferruginous hawks evolved in a landscape largely devoid of vertical structure, it is not surprising that they seemed to prefer nesting on ANPs more than 400m away from power lines. Doing so may offer some perceived protection against potential aerial nest predators, such as great horned owls. They also appeared to select sites well away from buildings, not a surprising result, considering they are easily disturbed. The lack of relationship with roads was not unexpected, especially considering that we defined "road" to include paved, gravel, or track trails, the latter of which may not have been used often, and could have very little associated disturbance. Ferruginous hawks also selected ANPs with fences within 400m significantly more than expected; these fences may provide useful hunting opportunities near the nest site. However, rather than a true preference for nest sites near fence lines, this may be more of a function of how common fence lines are in the prairie, and the relative ease of placing ANPs near fence lines because of site accessibility.

With all the above, it should be noted that 400m was chosen as an arbitrary cutoff for this project, not one that is necessarily meaningful to all, or any, ferruginous hawks. In many cases, power lines, roads, buildings, and fences were noted at distances just over 400m, or well over 400m, but were omitted from analyses. Further, interactions between multiple variables were not examined.

In general, observers noted that poles near loud developments, developments with a significant amount of human activity, or developments that had moving parts were rarely used by ferruginous hawks. These observations are consistent with research completed in other parts of the species range (Smith et. al. 2010a).

No conflicts were observed between the placement of these ANPs and other sensitive species; however, appropriate survey techniques were not used for other species at risk, such as the burrowing owl, sage-grouse, or sharp-tailed grouse. As such, any observation made would have been incidental. The lack of sightings does not necessarily indicate an absence of other sensitive species in the area; rather it simply indicates that these species were not detected during the ferruginous hawk artificial nest platform inventory. Further surveys would be required to determine if the ANPs are having an impact on other species at risk following appropriate survey methodologies for those species of concern

6.0 MANAGEMENT IMPLICATIONS AND FUTURE DIRECTION

Based on the 2009 nest pole inventory it appears that ANPs are a suitable action in the recovery of the ferruginous hawk. However this is true only when the pole is located in suitable locations based on the ferruginous hawk's habitat preference, prey requirements, and proximity to other nesting structures. To facilitate the use of ANPs in the recovery of ferruginous hawk, the *Artificial Nest Pole Installation and Construction Protocol* was developed as part of the study, and is intended for use as a recovery action for the ferruginous hawk. The *Protocol* is presented in the following section. This protocol should be followed during the planning, installation and maintenance of all ANPs for the ferruginous hawk.

Future plans include the development of a pamphlet with the information contained within the *Artificial Nest Pole Installation and Construction Protocol* that can be distributed to landowners and agencies interested in erecting ferruginous hawk platforms. Further, monitoring is a key component of measuring the success of any recovery action. More specifically, however, research suggests that ferruginous hawks may return to a historical nesting territory to take advantage of local prey resources, and breed on less than ideal substrates if their original nest structure is removed or destroyed (Stalmaster 1982). As such, its critical to ensure long-term monitoring and maintenance of ANPs is in place, to reduce the chance that ferruginous hawks will be attracted back to areas that no longer provide suitable nesting sites (Neal et al. 2010). ANPs assessed during this inventory will be maintained or upgraded as resources allow, and will be monitored on an as-needed basis.

7.0 ARTIFICAL NEST POLE INSTALLATION AND CONSTRUCTION PROTOCOL

Nesting sites are a key limiting factor for the ferruginous hawk (ASRD and ACA 2006). ANPs are a viable solution to this limiting factor. However, ANPs need to be sited in appropriate locations, based on the nesting requirements of ferruginous hawks, in order to maximize their benefit to the species.

The proximity to, or availability of, the factors listed below to proposed artificial nest pole site(s) should be evaluated during the siting process:

- Good quality native prairie habitat
- Alternate nesting structures (artificial or natural)
- Human infrastructure (power lines, roads, fences, buildings, etc.) in the immediate vicinity to the proposed pole
- Prey resources
- Sensitive areas for other species at risk (such as burrowing owl dens, sharp-tailed or sage grouse leks)

This protocol details:

- Pre-installation activities and research
- Artificial Nest Structure design
- Installation procedures and timing
- Monitoring and maintenance

7.1 Pre-installation activities and research

7.1.1When to use an artificial nest pole.

The ferruginous hawk nest pole study revealed that ANPs are used by the species; however, not all poles are used equally by the ferruginous hawk. Alternative elevated nesting structures such as trees are not common on the prairie landscape; as such, installation of ANPs should only be considered where natural nest substrates (trees or cliffs) have historically occurred, but human activity, storms, or other environmental factors have destroyed or removed them.

ANPs are occasionally used as a mitigation tool by industrial developers; this should occur only with consultation with ASRD-FWD.

7.1.2. General location

Natural nesting structures (cliffs and trees) on the prairies are often spread widely apart, therefore ferruginous hawk nesting territories are typically spread well apart from one another (Schmutz 1999). New ANPs should be located in areas with limited natural nests

or existing nest poles. New ANPs should be a minimum of 800 meters from existing nest poles or natural nesting structures.

7.1.3 Impacts of other wildlife

Approximately 70% of Alberta's species at risk are found within the Grassland Natural Region. Installing an ANP may be a positive action for ferruginous hawk recovery, but it may result in negative impacts to other species at risk. Ferruginous hawks primarily prey upon ground squirrels but will opportunistically prey upon amphibians, small birds, ducks, grouse and smaller raptors (ASRD and ACA 2006). A full wildlife survey should be completed prior to the placement of a new ferruginous hawk nest pole. A qualified biologist should specifically search for the following, at the appropriate time of year (see <sensitive species protocols>.

- Potential burrowing owl burrows
- Sharp-tailed grouse and greater sage-grouse leks.

Sharp-tailed grouse leks and burrowing owl burrows should be avoided by 800 meters. Research has shown that ferruginous hawks typically forage within 800 meters of their nest site (Janet Ng, pers. comm.); maintaining this distance from existing nest burrows and leks will decrease the potential for opportunistic foraging on these sensitive species by the ferruginous hawk or other raptor species.

ASRD-FWD Medicine Hat office should be consulted prior to the development of any ANPs proposed in areas identified as Critical Habitat for the greater sage-grouse as defined in the <Federal Greater Sage Grouse Recovery Strategy. >

7.1.4. Habitat and disturbances

Ferruginous hawks primarily select nests in areas of greater than 50% native prairie habitat (Schmutz 1999, ASRD and ACA 2006); any new ANP should be placed in similar habitat. Further, ferruginous hawks are sensitive to man made disturbances. Siting locations should avoid gravel roads, paved roads, power lines, oil and gas developments, and farmyards by a minimum of 1000 meters (ASRD 2010, Smith et al. 2010a, Smith et al. 2010b). Finally, ANPs should not be sited close to permanent water bodies, where possible. A qualified biologist should be consulted during the siting process.

7.1.5 Prey

Ferruginous hawks nest in higher densities in areas of high ground squirrel abundance (Downey et al. 2009). One pair of ferruginous hawks can consume 500 or more ground squirrels in a single nesting season, making them an ideal form of prey control (ASRD and ACA 2006). In order to increase the likelihood of a new ANP being used by a ferruginous hawk pair, the location of the pole should be in areas with healthy populations of Richardson's ground squirrels (*Urocitellus richardsonii*). A survey protocol for Richardson's ground squirrel has been developed and can be used to assist in location selection (Downey 2003). Surveys should be conducted prior to pole installation.

7.2 Pole Design

The 2010 nest pole study found several different kinds of ANPs. The most commonly used and successful models are shown in Appendix C.

7.3 Pole Installation

Poles should not be installed between April 1st and July 15th. Ferruginous hawks establish their nesting territory in early April and lay eggs at the start of May. Eggs hatch in early June and the young fledge around mid-July (ASRD and ACA 2006). Further, many grassland birds, mammals, and herptiles also breed and raise their young during this time of year. Creating additional disturbance to these species during installation activities (travelling to site, erection of pole, etc) may negatively impact their breeding success. A nest pole installed after April 1 will not be used by ferruginous hawks until the following spring; as such, there is little gain to installing the pole during this critical period for prairie wildlife.

New ANPs should be established between July 16th and March 31st. As heavy equipment is necessary, installation should occur on dry or frozen ground to decrease the impact on native grasses. Established trails or roads should be used where possible.

Once the pole is installed, the Artificial Nest Data Form (see Appendix D).should be filled out and filed with the Provincial Ferruginous Hawk Lead.

7.4. Monitoring and Maintenance

To determine the success of increasing nesting habitat for ferruginous hawks in the Grassland Natural Region, each new artificial nest pole should be monitored annually by the person/agency responsible for it. The responsible person or agency should visit the pole annually, between May 1 and June 30, to determine if the pole is in use. The pole should be observed with binoculars or spotting scope from a minimum distance of 200m, to avoid disturbing nesting hawks. Visits should be limited to under 15 minutes to ensure that birds are not away from the nest for prolonged periods. Whether the pole is being occupied by a ferruginous hawk, other bird species, or is inactive should be reported to the Provincial Ferruginous Hawk Lead. The information collected will be used to determine:

- How successful artificial nesting poles are in the recovery of ferruginous hawks
- Required changes to the artificial nest pole protocol

Monitoring should occur annually until the first recorded use of the site by the target species. Site should be revisited at least every 2 years after the first occupation.

7.4.1 Maintenance

ANPs should be checked at least once every 5 years outside of the breeding season. If repairs are identified during these checks, the responsible person/agency should complete the repairs prior to April 1. If a pole is damaged and will not be repaired or is deemed to be ineffective, the pole should be removed, and replaced if possible, by the responsible person/agency.

8.0 FURTHER REQUIREMENTS FOR RECOVERY ACTION IMPLEMENTATION

The 2009 nest pole inventory was initiated and completed as an action under the Alberta Ferruginous Hawk Recovery Plan. Within the recovery plan the nest pole inventory was identified as a key management action in a step towards correcting a limiting factor; the number of nest sites available for the ferruginous hawks. During the study several additional actions were identified that should be completed in order to assist in the recovery of the ferruginous hawk, and are listed below

1. Assess the state of poles in previously uninventoried areas. Areas such as the Manyberries area had limited searches completed as part of this inventory. Further efforts are needed to fully understand how many poles exist in these areas and if they are being used by the ferruginous hawk.

2. Maintenance and repair of existing ferruginous hawk nest poles. 88 poles were in need of some form or repair (minor and/or major). Poles that have a high likelihood of use by ferruginous hawk should be repaired. In order to facilitate this, the landholder should be contacted to determine who originally erected the nest pole. Additional support should be sought from the original nest pole developer.

3. Removal and replacement of downed nest poles: The four nest poles that have fallen down should be removed as the broken pole and nesting platform may form a hazard. Where possible these nest poles should be replaced with new poles that are constructed using the protocol within this report.

4. Development of future nest poles: Nest poles are an appropriate action in the recovery of the ferruginous hawk. New nest poles should be developed under the strict guidance of the protocol above. Groups or individuals developing new nest poles should contact the Provincial Ferruginous Hawk lead for further information on the development of nest poles.

5. Development of a landholder friendly protocol: As the majority of nest poles will be developed by non-government organizations for private landholders, a brochure detailing the nest pole protocol should be developed and distributed to landowners. This protocol will be an advertisement for this necessary ferruginous hawk recovery action as well as provide background information on the species.

*6. **Further research requirements:*** The 2009 nest pole inventory only identified if ferruginous hawks were using ANPs and the characteristics of the habitat surrounding these nest poles. It did not identify the success of breeding attempts on the nest poles, nor did it determine whether nest poles were used more often than natural nesting structures where both were available.. Further, the productivity of nests on ANPs compared to that of nests on natural substrates should be examined. Answers to these questions are important in determining the overall success of this recovery action.

*7. **Database Maintenance**:* The database created for this study on the location, use and maintenance of ANPs should be maintained. Analyses on the use of the poles, locations and any positive or negative impacts should be conducted regularly to determine if changes are required for this protocol.

9.0 LITERATURE CITED

Alberta Ferruginous Hawk Recovery Team. 2009. Alberta Ferruginous Hawk Recovery Plan 2009-2014. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Recovery Plan No. 17, Edmonton, AB. 44pp.

Alberta Sustainable Resource Development. 2010. Upstream oil and gas approval standards for the enhanced approval process. Alberta Sustainable Resource Development, Edmonton, Alberta. 44 pages

Alberta Sustainable Resource Development and Alberta Conservation Association. 2006. Status of the ferruginous hawk (*Buteo regalis*) in Alberta. Update 2006. Alberta Sustainable Resource Development, Wildlife Status Report No. 18 (Update 2006), Edmonton Alberta, 22.pp.

Downey, B. A. 2003. Survey protocol for the Richardson's ground squirrel. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 69, Edmonton, AB.

Downey, B.A, P.F. Jones, R.W. Quinlan and B.L Downey. 2009. Influential Variables on Ferruginous hawk Nest Site Selection in Alberta. Unpublished report. 20 pages.

Natural Regions Committee. 2006. Natural regions and subregions or Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta. Pub. No. I/005.

Neal, M.C. 2007. Dynamics associated with ferruginous hawk (Buteo regalis) nest site utilization in south-central Wyoming. A thesis Submitted to the Department of Renewable Resources and The Graduate School of the University of Wyoming.55 pages

Neal, M.C., J.P. Smith, and S.J. Slater. 2010. Artificial nest structures as mitigation for natural-gas development impacts to Ferruginous Hawks (*Buteo regalis*) in south-central Wyoming. BLM Technical Note 434. USDI Bureau of Land Management, Utah State Office, Salt Lake City, Wyoming State Office, Cheyenne, and Colorado State Office, Lakewood. 16 pp.

Schmutz, J. K. 1993. Population trends of ferruginous hawks in Alberta, including a synthesis of for prairie Canada. Unpubl. Rept for the Committee on the Recovery of Nationally Endangered Wildlife in Canada (RENEW), Ottawa, ON. 21 pp.

Schmutz, J.K. 1999. Status of the Ferruginous Hawk (Buteo regalis) in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 18. Edmonton AB. 18 pp.

Schmutz, J.K. Unpublished. Artificial nests for ferruginous hawks in southeastern Alberta. Arctic Institute of North America. University of Calgary. 26 pp.

Schmutz, J. K., R. W. Fyfe, D. A. Moore, and A. R. Smith. 1984. Artificial nests for Ferruginous and Swainson's Hawks. J. Wildl. Manage. 48: 1009-1013.

Smith, J.P., S.J. Slater, and M.C. Neal. 2010a. An assessment of the effects of oil and gas field activities on nesting raptors in the Rawlins, Wyoming and Price Utah field offices of the Bureau of Land Management. U.S. Department of Interior Bureau of Land Management Utah State Office, Salt Lake City, Utah. 68 pages.

Smith, J.P., S.J. Slater, and M.C. Neal. 2010b. Recommendation for improved raptor nest monitoring in association with oil and gas development activities . U.S. Department of Interior Bureau of Land Management Utah State Office, Salt Lake City, Utah. 40 pages.

Stalmaster, M. V. 1982. Ferruginous Hawk nesting mitigation study: 1982 Deseret-Western Railway Project. ERO Resource Corp., Golden, CO U.S.A.

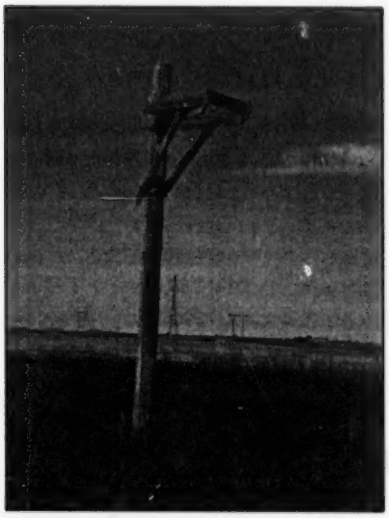
10.0 PERSONAL COMMUNICATION

Janet Ng, PhD Candidate, Department of Biological Science, University of Alberta

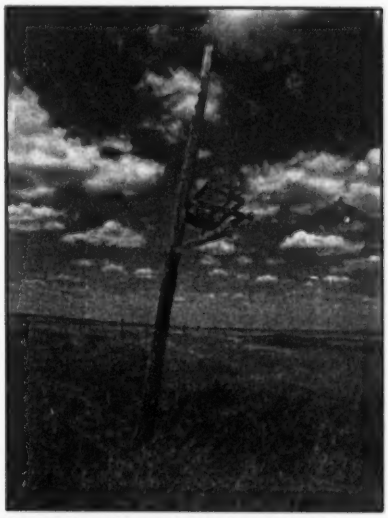
Dr. Josef Schmutz, College of Agriculture and Bioresources, University of Saskatchewan

APPENDIX A

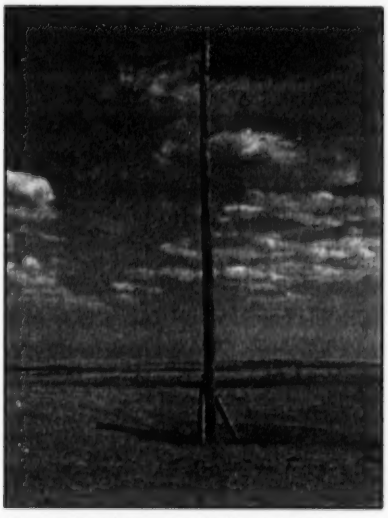
The photos below show examples of poles classified as Category I, II, III, and IV during the Ferruginous Hawk Artificial Nest Pole project. Photos by Anna Migaj.



Example of a nest pole in good condition (class I)



Example of a nest pole in need of minor repairs (class II)



Example of a nest pole in need of major repair (class III)

Example of a nest pole that has fallen down (class IV)

APPENDIX B

Ferruginous Hawk Nest Pole- New Installation

The following information is collected for monitoring the effectiveness of artificial nest poles as a recovery action for the ferruginous hawk. All information will be stored in by the Provincial Recovery Team.

Location (GPS location, UTM, Nad 83): Easting:_____ Northing:_____

Name of pole (optional):_____

Name of person/Agency/company:_____

Contact info: Phone:_____ email:_____
Mailing Address: _____
_____

Name of landholder (optional):_____

Reason for installation

☐ Replacement of old ANP

☐ Loss of natural nest site (eg., blow down)

☐ Habitat enhancement

☐ Other : _____

Pictures of pole and location

All information should be sent to Alberta's Provincial Ferruginous Hawk Lead:

Brandy Downey
Lethbridge Sr. Species at Risk Biologist
Alberta Sustainable Resource Development
2nd Floor, YPM Building
530 8th Street South
Lethbridge Alberta
T1J 2J8
Phone (403) 381-5526
Email: brandy.downey@gov.ab.ca

Ferruginous Hawk Artificial Nest Pole: Record of Occupation

The following information is collected for monitoring the effectiveness of artificial nest poles as a recovery action for the ferruginous hawk. All information will be stored in by the Provincial Recovery Team.

Location (GPS location, UTM, Nad 83): Easting:_____ Northing:_____

Name of pole (optional):_____

Name of observer:_____

Contact info: phone:_____ email:_____

Mailing Address: _____

_____

Name of person responsible for the pole:_____

Species:_____ **Date:**_____

Number of Adults?		Number of Young?	
Nesting location (circle) Tree Shrub Nesting Pole Ground Other	Describe (incl. tree species):	Height of Tree/Shrub/Pole in meters: Height of nest in meters:	
Ground squirrels present?	Y / N		

Additional Features – indicate yes or no and circle closest distance to nest

Barbed Wire Fence	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Roads (Gravel, Paved, or Trail)	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Power Lines	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Buildings (Active or Abandoned)	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Other:	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400	

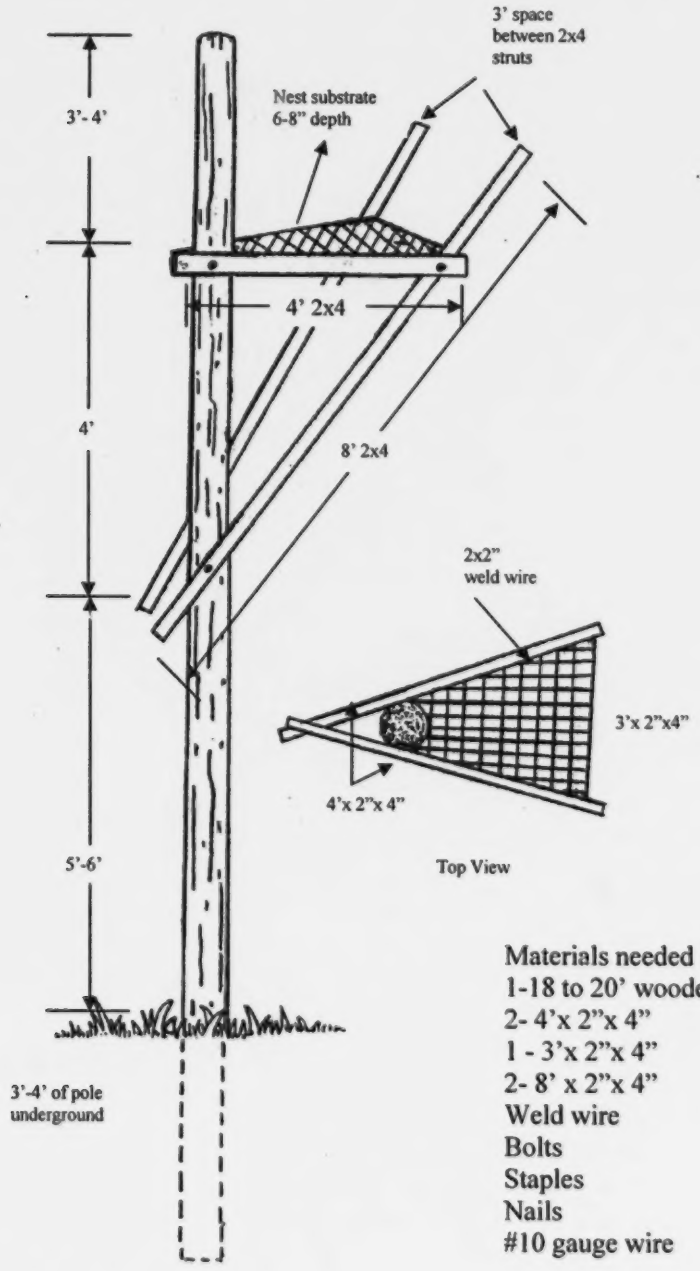
Pictures of pole and location: Please attach and send with this form.

All information should be sent to Alberta's Provincial Ferruginous Hawk Lead:

Brandy Downey
Lethbridge Sr. Species at Risk Biologist
Alberta Sustainable Resource Development
2nd Floor, YPM Building
530 8th Street South
Lethbridge Alberta
T1J 2J8
Phone (403) 381-5526
Email: brandy.downey@gov.ab.ca

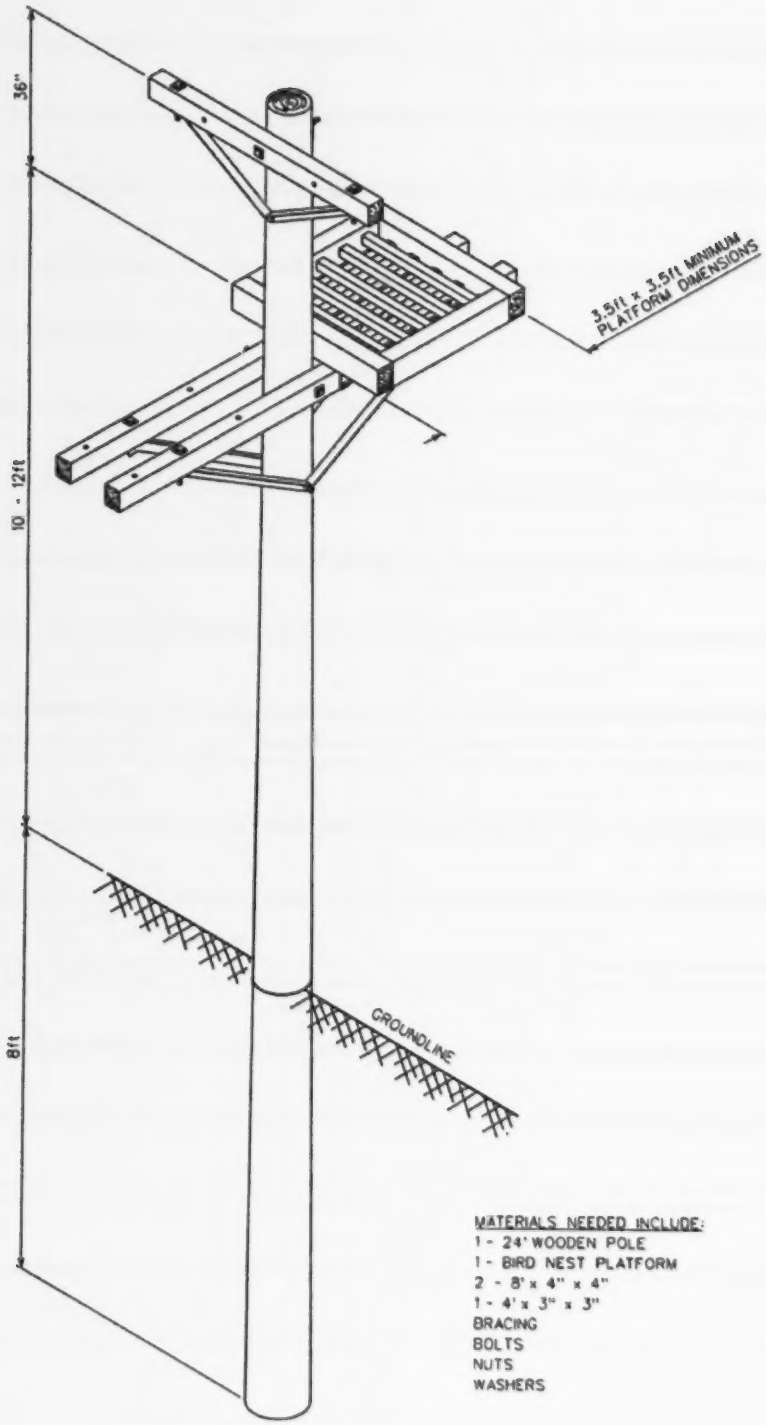
Appendix C: Ferruginous Hawk Nest Pole Designs

Triangle Pole:
Most common design found in Alberta. Design adapted from the North American Waterfowl Management Plan, Schematic by Kristen Rumbolt.



Materials needed include:
1-18 to 20' wooden pole
2- 4'x 2"x 4"
1 - 3'x 2"x 4"
2- 8' x 2"x 4"
Weld wire
Bolts
Staples
Nails
#10 gauge wire

AltaLink Design



ALTALINK

For a list of additional reports in the Alberta Fish and Wildlife Division-Species at Risk Report Series please go to our website.

http://srd.alberta.ca/BioDiversityStewardship/SpeciesAtRisk/ProgramReports.aspx